

REMARKS

Claims 1-20 are pending in the application. Claims 1, 8, 13 and 20 have been objected to. Claims 1-20 are rejected. Claims 1, 8, 13, 19 and 20 have been amended. New claims 21 and 22 have been added. Reconsideration and allowance of claims 1-22 is requested.

Claim Objections

Claims 1, 8, 13 and 20 are objected to because of informalities.
Applicant has amended the claims as suggested by the Examiner.

Claim Rejections - 35 U.S.C. § 102

Claims 8 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Lukanc, U.S. 6,121,149.

Lukanc fails to teach each and every element of claim 8. First, Lukanc fails to teach at least the element of removing the second mask and the metal layer to expose an upper surface of the insulating layer. Second, Lukanc also fails to teach the element of successively forming an insulating layer and a first mask layer.

First, it was alleged that the upper portion 3U of the insulating layer 3 discloses a mask layer. Even if this upper portion 3U of the insulating layer 3 were a mask layer (which it is not), Lukanc would fail to teach removing the mask layer because Lukanc does not disclose or suggest removing the upper portion 3U of the insulating layer. It was alleged that figure 1 shows removal of the upper portion 3U. However, referring to figure 1, only the metallization layer 5 is removed. No portion of the insulating layer 3 is shown to be removed. See col. 3, lines 40-46 "the entire excess thickness t of the metal overburden layer 5 over the surface 4 of the dielectric layer 3 is removed by a CMP process..." After removal of the metal layer 5 both the dielectric layer 3 and the surface 4 of the dielectric layer 3 remain completely intact. See figure 1. Finally, Lukanc teaches away from any modification by removing the upper portion 3U of the dielectric layer 3 by specifically showing that the surface 4 of the insulating layer 3 remains intact.

In contrast, claim 8 includes the element of removing the second mask and the metal layer (not just the metal layer) to expose an upper surface of the insulating layer. Lukanc does not anticipate claim 8 because Lukanc does not expressly or inherently teach each and every element as set forth in claim 8 (see, e.g., MPEP 2131 - "A claim is anticipated only if

each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”). Thus, claim 8 should be allowed for this first reason.

Second, it was alleged that the formation of the insulation layer 3 teaches the element of successively forming an insulating layer and a first mask layer. Even if this upper portion 3U of the insulating layer 3 were a mask layer (which it is not), there is no successive formation. The entire insulation layer 3 including the upper portion 3U is formed at once using the same material. An insulation layer that is formed all at once, as a single layer and using a single material does not teach successively forming an insulation layer and a mask layer.

In contrast, claim 8 includes the element of successively forming an insulating layer and a mask layer. Successively forming requires at least using two different types of materials or forming at different points in time. See the present specification, page 6, lines 8-15. Thus, claim 8 should be allowed for at least this second reason. MPEP 2131.

Claims 10-12 depend from claim 8. Consequently, Lukanc also fails to anticipate these claims for at least the reason that Yamada does not teach each and every element that is inherent to the claims. MPEP 2131.

Claim Rejections - 35 U.S.C. § 103

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lukanc, U.S. 6,121,149.

Claim 9 depends from claim 8. Any claim that depends from a nonobvious independent claim is also nonobvious. MPEP 2143.03, *citing In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lukanc, U.S. 6,121,149 in view of Liu, U.S. 6,010,962.

Claim 20 should be allowed for at least a similar reason as claim 8.

Claims 1-7 and 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, U.S. 5,712,185 in view of Lukanc, U.S. 6,121,149.

Claim 1 has been amended. Support for the amendment can be found in figure 5F of the present specification. First, there is no suggestion to modify the insulating isolation trench of Tsai to become a conductive region. Such a proposed modification would render

Tsai unsatisfactory for its intended purpose (see MPEP 2143.01, second to the last entry.) Second, even if there were a suggestion to modify Tsai with Lukanc (which there is not), the combination would fail to teach etching the insulating layer to form a hole thereby exposing a conductive material at a bottom of the hole.

First, there is no suggestion to modify the insulating isolation trench of Tsai to become a conduction region. "If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or modification to make the proposed modification." See MPEP 2143.01, second to the last entry. Here, the intended purpose of Tsai is to create an improved insulating isolation trench that is capable of stopping "current leakages, which can consume significant power for the entire chip." Col. 1, lines 12-23. The proposed modification of replacing the insulation layer 40 that forms an isolation region with a conductive metal would create a short circuit between two active regions, which would produce an electrical connection which is the exact opposite of stopping current leakages. The short circuit would make Tsai unsatisfactory for its intended purpose. Thus, there is no suggestion to replace the insulation layer 40 with a conductive material such as a metal. To modify a reference to establish a prima facie case of obviousness, the first criterion must be met (see, e.g., MPEP 2143; MPEP 2143.03).

Second, even if there was a suggestion to replace the insulation layer 40 with metal (which there is not), the combination would still fail to teach the element of etching the insulating layer to form a hole thereby exposing a conductive material at a bottom of the hole. Referring to figure 3D, the semiconductor region 30 below the isolation layer is not doped and is thus not conductive material. Forming the hole 38 does not expose a conductive material at a bottom of the hole but instead only exposing undoped semiconductor material.

In contrast, claim 1 includes the element of etching the insulating layer to form a hole thereby exposing a conductive material at a bottom of the hole. Because all the features recited in a claim must be taught or suggested by the prior art, the fact that Tsai fails to teach or suggest this feature is, by itself, sufficient to prove that Tsai does not meet the third criterion for establishing a prima facie case of obviousness for claim 1 (see, e.g., MPEP 2143; MPEP 2143.03). Thus, claim 1 should be allowed.

Claims 2-7 depend from claim 1. Any claim that depends from a nonobvious independent claim is also nonobvious. MPEP 2143.03, *citing In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

Claim 13 should be allowed for at least the reasons discussed with respect to claim 1. Claims 14-19 depend from claim 13. Any claim that depends from a nonobvious

independent claim is also nonobvious. MPEP 2143.03, citing In re Fine, 837 F.2d 1071 (Fed. Cir. 1988).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, U.S. 5,712,185 in view of Lukanc, U.S. 6,121,149 as applied to claim 16 above, and further in view of Mayer, U.S. 6,402,923.

Claim 17 depends from claim 13. Any claim that depends from a nonobvious independent claim is also nonobvious. MPEP 2143.03, citing In re Fine, 837 F.2d 1071 (Fed. Cir. 1988).

New Claims

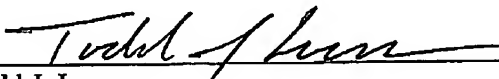
New claims 21 and 22 have been added. Support can be found on page 6, lines 3-4 and figures 5A and 7E.

Conclusion

For the foregoing reasons, reconsideration and allowance of claims 1-22 of the application as amended is solicited. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

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